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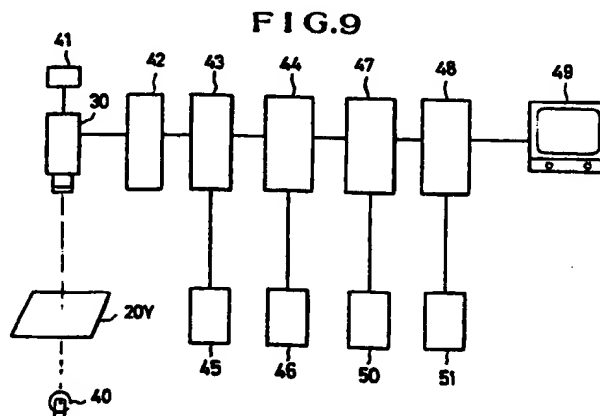
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64 Method and apparatus of checking an arrangement of printing pages.

57 The present invention relates to a method and an apparatus which check, where images for a plurality of page portions are printed simultaneously, whether or not the image on each page is properly arranged in a predetermined position. Particularly, the image of material to be checked is photographed and stored by unit of a section at every page, and the image is displayed on a monitor television by unit of two opened-pages to effect said checking. Thus, in the case of the printed matter in which one image is reproduced over the two-opened-pages, not only checking to see if the arrangement of pages is proper but also checking to see if there is a difference in density or tone between left and right pages can be carried out.



TITLE OF THE INVENTION

## METHOD AND APPARATUS OF

## CHECKING AN ARRANGEMENT OF PRINTING PAGES

BACKGROUND OF THE INVENTION

## 5 I. Field of the Invention

The present invention relates to a method and apparatus which checks, where images for a plurality of page portions are printed simultaneously, whether or not the image on each page is arranged in a predetermined position, and particularly to a method and apparatus intended to effect said checking by making use of a monitor television.

## 10 II. Description of the Prior Art

In the past, it is widely carried out that where books, catalogues and the like are printed, images for a plurality of page portions are printed simultaneously. In such a case, the printed matters in which a plurality of page portions are printed are folded by a folding machine in such a way that each page is disposed in a proper order. In order that each page may be disposed in a proper order when the printed matters are folded by the foling machine, it is necessary that an image on each page formed on a printing plate is arranged in a predetermined position.

25 Figs. 1 through 3 illustrate one example how an image on each page is arranged when 16 page portions are

printed simultaneously. In the drawings, in pages where numerals showing the state of arrangement of images on pages are inversely indicated in the direction of the top and bottom of the pages, the images thereof are also inversely arranged, and in pages where said numerals are normally indicated in the direction of the top and bottom of the pages the images thereof of are also normally arranged. Figs. 1 (a) and (b) show the state in which images P1, P2, P3, ... P16 for a plurality of page portions are arranged on two sheet-like base materials 20 and 21. On the sheet-like base material 20 is arranged pages for portions to be printed on the front face whereas on the sheet-like base material 21 is arranged pages for portions to be printed on the reverse face. For the sake of simplicity, a description will be given of the example wherein transparent plastic films are used for the sheet-like base materials 20 and 21 in Fig. 1, and the images P1 to P16 for a plurality of page portions are the ones in which transparent positive images or negative images are adhered to said sheet-like base materials 20 or 21, that is films with plural paginations for printing or flats. However, the invention is not limited to the above but it will be understood that for example, the sheet-like base material can be a PS plate for offset printing and the images P1 to P16 can be images

formed on said PS plate.

Two printing plates are prepared from two films with printing flats, respectively, on which images on pages are arranged, as shown in Figs. 1(a) and (b), and said printing plates are used to print on both front face and reverse face of paper or other materials to be printed. Fig. 2 shows printed matter 22 printed by the offset printing process, wherein numerals on the printed matter 22 indicate pages shown by the respective numerals, numerals not put in parentheses indicate pages printed on the front face of the printed matter 22, and numerals put in parentheses indicate pages printed on the reverse face at positions where the respective numerals are arranged. That is, the pages 16, 1, 4, 13, 9, 8, 5 and 12 are respectively printed on the front face and are arranged at positions indicated by the corresponding numerals. On the other hand, the pages 15, 2, 3, 14, 10, 7, 6, and 11 are respectively printed on the reverse face and are arranged at positions indicated by the corresponding numerals. Again, where the numerals showing pages are inversely disposed in the direction of the top and bottom of the pages, the printing images are also inversely disposed.

Thus, obtained printed matter 22 is first folded along the line A-A, then folded along the line B-B and finally folded along the line C-C to thereby obtain a section (or signature) 23 in which pages from

the first page to the 16th page are disposed in a proper order as shown in Fig. 3.

5 The thus obtained section is, if necessary, combined with other sections and a side folded along the line C-C is used as a binding portion to bind a book, and ends of other sides are cut and each page is opened for reading. Figs. 4(a) through (i) show the state how the pages appear when they are opened.

10 As can be seen well from Fig. 4, the thus obtained book is so designed that one can read the book from the left page, which system is employed for English books and Japanese books with characters written laterally.

15 In the case of Japanese books with characters written longitudinally conversely to the case of Fig. 4, the book can be read from the right page, in which case, images on pages are arranged as shown in Figs. 5(a) and (b), whereby after printing, folding and cutting have been made, pages can be opened as  
20 shown in Figs. 6(a) through (i) for reading.

As may be understood from the above-described explanation, where images (characters, pictures and the like) for a plurality of pages are printed simultaneously, it is necessary to check, in the  
25 stage of preparing the flats or printing plates with the plural paginations (see Figs. 1 and 5), whether

or not an image on each page is properly arranged in a predetermined position. However, this checking involves considerably complicated elements. That is, the arrangement of the image on each page to what position of the sheet-like base material depends on (a) how many page portions are printed simultaneously, (b) the kind of books which should be read from the right or from the left, (c) the type of folding to be employed, and the like.

Accordingly, it is extremely difficult to imagine whether or not the sections after completion of folding work are disposed in a proper page order from the state where the image on each page is arranged on the sheet-like base material. Nevertheless, a sole dependence has been heretofore placed upon a method of checking using imagination of human being. Therefore, in the event that the image on each page has been arranged in the wrong position, such an error is difficult to find, and preparing of printing plates, printing and book-binding sometimes proceed without correction of such erroneous arrangement. Thus, in such a case, not only all the materials used therefor are wasted, but a tremendous time is wasted.

In the case of multi-color printing, for example, in the case of four colors printing, sheet-like base materials 20Y, 20M, 20C and 20Bk such as films

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laid out for four colors of Y (yellow), M (magenta),  
C (cyan) and Bk (black) with pages for portions to be  
printed on the front face disposed and sheet-like  
base materials 21Y, 21M, 21C and 21BK such such as  
5 films laid out for four colors of Y, M, C and Bk  
with pages for portions to be printed on the reverse  
face disposed, as shown in Fig. 7, are necessary.  
In this case, an error in that for example, the image  
for a Y-separation and the image for a M-separation  
10 are misplaced each other in a certain page sometimes  
occurs particularly where both the images are  
similar to each other.

It is hard to take notice of such an error  
until printing is actually carried out, and printing  
15 step proceeds under the erroneous condition, resulting in  
an occurrence of great damages.

Moreover, it is often that color separation  
films for pages are manufactured by separate plate makers,  
and it is also often that these color separation films  
20 manufactured by separate plate makers are collected  
and arranged on a single sheet-like base material for  
makeup and printing. In such a case, each of the  
plate makers carries out color proof of only the color  
separation films manufactured by their own company.  
25 Thus, if the color proof standards are different between  
the companies, tones in pages are not in coincidence

with each other when the color separation films of various companies are collected and arranged in a single base material for making a plate and printing, and therefore, it has been necessary to stop operation of the printing machine whereby a flat is corrected and afterwards, a printing plate is newly made, or when a flat is exposed to a light source on a plate such as a PS (presensitized) plate, an exposing operation is carried out while making adjustment such as adjustment of an amount of exposure to make a printing plate newly.

Particularly where one image is printed over two opened-pages, a difference in density and tone tends to be conspicuous and a problem tends to occur.

Such a problem occurs also in the case of monochromatic printing but is particularly conspicuous in case of multi-color printing. In view of the foregoing, it has been desired to develop a method or apparatus which can easily check whether or not each page is properly arranged, and which where one image is printed over the two opened-pages, can easily check a difference in density and tone.

#### SUMMARY OF THE INVENTION

Accordingly, the present invention has been achieved as the result of various studies in an attempt of solving these problems noted above. An object of the



invention is to provide a method which can easily perform checking whether or not the state of arrangement of pages is proper under the condition of a flat or a printing plate.

5           A further object of the invention is to render possible each checking of misplacement between colors in case of multi-color printing.

10           Another object of the invention is to easily perform even checking of a difference in tone and density in the open pages. A still another object of the invention is to provide a new apparatus which can perform the aforesaid checking.

15           In accordance with the present invention, images on pages arranged on sheet-like base materials are photographed in a predetermined order by a photographic apparatus, for example, a television camera to store images for a single section (which are the images on pages arranged on the sheet-like base materials 20 and 21 in case of Fig. 1, for example; and the images on pages arranged on the sheet-like base materials 20Y, 20M, 20C, 20Bk, and 21Y, 21M, 21C, 21Bk, in case of Fig. 7, for example) into a memory. Next, in accordance with the thus stored image signals, to the images are displayed in colors on an image display device (for example, a color monitor television) after 25 the required processing.

The aforementioned required processing is the process whereby where a section is prepared in accordance with the predetermined folding system, what order of the pages will be can be easily judged by viewing the images displayed on the foresaid image display device. In this case, it is necessary to predesignate data such as the number of pages, the way of opening a book (right-open or left-open) and the like in addition to the folding system. In this manner, it is possible easily confirm whether or not each page is arranged in a proper position by the image displayed, and in addition, it is possible to easily check whether or not the density or tone of the images over the opened-two pages is within the allowable range.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an explanatory view of the state where images for a plurality of page portions are arranged on two sheet-like base materials;

Fig. 2 is an explanatory view of printed matter where the images on each page arranged as shown in Fig. 1 are printed on the face and reverse of a substance to be printed;

Fig. 3 is an explanatory view of a section in which the printed matter of Fig. 2 is folded;

Fig. 4 is an explanatory view to explain how pages appear when a book is bound from the section of

Fig. 3;

Fig. 5 is an explanatory view of the other state where images for a plurality of page portions are arranged on two sheet-like base materials;

5 Fig. 6 is an explanatory view to explain how pages appear after the images arranged as shown in Fig. 5 have been printed, folded and bound;

Fig. 7 is an explanatory view of a sheet-like base material having images for one section portion  
10 in four colors printing;

Fig. 8 is a schematic illustration of a television camera driving mechanism of the apparatus in accordance with the present invention;

Fig. 9 is block diagram of the apparatus in  
15 accordance with the present invention;

Fig. 10 illustrates details of an image display control device; and

Fig. 11 is an explanatory view showing the relation between the images arranged on the pages  
20 and the image synthesized and displayed.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention overcomes various problems as noted above with respect to prior arts and is intended, by using a monitor television, to check a  
25 position of arrangement of pages and check a difference in density and tone of open pages in a simple manner.

The present invention will now be described in detail with reference to the drawings.

Fig. 8 is an explanatory view of a television camera driving mechanism as a photographic apparatus driving mechanism in which images arranged on a sheet-like base material are photographed by a television camera used as one example of the photographic apparatus. First, the case will be described in which images for 16-page portion as shown in Figs. 1 through 3 are arranged and subjected to monochromatic printing to produce a section.

First, images on the sheet-like base material 20 are photographed in order of P9, P8, P5, P12, P13, P14, P1 and P16 by a television camera 30, the sheet-like base material 20 is then removed and another sheet-like base material 21 is set, and images thereon are photographed in order of P11, P6, P7, P10, P15, P2, P3 and P14 in a manner similar to that of the former. The thus photographed images of the pages are stored in the form of image signals in a memory. All the image signals required for one section are stored in the memory.

The television camera 30 is mounted on a lead screw 31, and the lead screw 31 is rotated by a motor 32 whereby the television camera 30 may be moved along a guide bar 33 in an X-direction (in a lateral direction).

On the other hand, the motor 32 is mounted on a lead screw 34, and the lead screw 34 is rotated by a motor 35 whereby the motor 32 may be moved along a guide bar 36 in a Y-direction (in a longitudinal direction).

5 Thus, the television camera can be moved freely in both X and Y directions. It is noted that rotation of the motors 32 and 35 is controlled by a motor control device 37. The motor control device 37 is given, before-

10 hand or when necessary, data such as the number of pages arranged on the sheet-like base material, sizes of pages and the like. Thereby, the motor control device 37 moves the television camera to a predetermined photographing position.

The case of monochromatic printing has been

15 described above. In case of multicolor printing, for example, in case of four colors printing, it is necessary, in order to print both faces of a sheet, to photograph images on pages arranged on eight sheet-like materials as shown in Fig. 7 to store them in

20 the form of image signals in the memory. Storing of images on each page arranged on eight sheet-like materials as shown in Fig. 7 is carried out in the following manner.

That is, the images for the first color as

25 in the case of said monochrome, for example, the sheet-like base materials 20Y and 21Y for the Y-separation

are photographed and stored in the form of image signals in the memory 44 in a manner similar to that of the monochrome, and images of the sheet-like base materials 20M and 21M for the M-separation, the  
5 sheet-like base materials 20C and 21C for the C-plate and the sheet-like base materials 20Bk and 21Bk for the Bk-separation are likewise successively photographed and stored in the form of image signals in the memory 44 (see Fig. 9).

10 Alternatively, the sheet-like base materials 20Y, 20M, 20C and 20Bk having images for printing the front face can be successively photographed to store the images on each page in the memory, and thereafter, the sheet-like base materials 21Y, 21M, 21C and 21Bk  
15 having images for printing the reverse face can be successively photographed to store the images on each page in the memory.

The images stored in the memory 44 as described above have been subjected to processing which will  
20 be described hereinafter and are thereafter displayed in color on a color image display device.

Fig. 9 is a schematic illustration of the apparatus in accordance with the present invention which processes the image signals of the images  
25 photographed by the television camera as described above to display the images on the image display device.

The sheet-like base material 20Y having the images on each page arranged thereon is illuminated by a light source 40 and the images are photographed for every page by the television camera as previously described. The television camera 30 is moved in the X and Y directions by a television camera driving mechanism 41. The photographed image signals on each page are corrected in white and black level by a white and black level correction circuit 42, after which they pass through a mask circuit 43 and are stored in a memory 44. The mask circuit 43 is provided to cut unnecessary portions among the image signals obtained by the television camera. That is, when the images on each page are photographed by the television camera, a part of the image on the page in the periphery of the page required is also photographed at the same time, and therefore, the unnecessary image on the page in the periphery thereof is cut by the mask circuit 43. The size of the mask is set by a mask operating section 45. For the mask operating section, a keyboard or the like can be employed. In this manner, the image signals on all pages required for one section with respect to the entire front and reverse faces of the sheet-like base materials for each color are stored in the memory 44. Since in this case, photographing of the images on each page is carried out

in a predetermined order , it is possible to discriminate that the image signal stored in the respective address correspond with the image what position it was arranged in. Or, it is also possible to designate the address for storing each image signal by the control device 46 for the memory.

An image display control device 47 is provided to select and combine necessary signals out of image signals of different colors stored in the memory 44 in accordance with a combination type determined by a folding system, the number of pages of the section and the way of opening a book (right-open or left open), and further to invert the top and bottom of the images necessary to be inverted in the direction of the top and bottom thereof and to input the images to a printing image control device 48. This printing image control device 48 is provided to perform processing for displaying an image approximate to a color printed matter as will be described hereinafter. Signals processed by the printing image control device 48 are put into a color image display device 49 and the combined image is displayed in color.

For the image display device 49, a color television set or the like is used.

The aforesaid image signals are combined in such a way that when pages are opened in order under the



finally folded condition, each page is visible, as shown in Fig. 4. That is, as shown in Fig. 4(a), the first page is positioned on the right-hand of the screen of the image display device whereas the left side is to be blank. Next, as shown in Fig. 4(b), the second page and the third page are combined so that the second page occupies the left-hand position whereas the third page occupies the right-hand position. Similarly, as shown in Figs. 4(c) through 4(h), the 4th page and the 5th page, the 6th page and the 7th page, the 8th page and the 9th page, the 10th page and the 11th page, the 12th page and the 13th page, and the 14th page and the 15th page are respectively combined so that among these combinations, even pages occupy the left-hand position of the screen of the image display device whereas odd pages occupy the right-hand position of said screen, and the thus combined images are displayed in color on the image display device 49. Finally, the 16th page is occupied on the left-hand of the screen of the image display device 47 whereas the right-hand thereof is to be blank, as shown in Fig. 4(i).

In this case, where the images on the pages are arranged as shown in Figs. 1 (a) and (b), the images P9, P8, P5 and P12, and the images P11, P6, P7 and P10 are in the state of inversion in the direction of the top and bottom thereof, and therefore, the

images are processed to be inverted by the image display control device 47 so that these images are visible under the normal state when they are displayed by the image display device.

5           If the images on the pages are arranged as shown in Figs. 5 (a) and (b) to effect printing and folding, they are as shown in Figs. 6 (a) through 6 (i). In this case, therefore, the combinations of the images on the pages displayed on the image display device  
10           are determined so as to occupy the positions as shown in Figs. 6(a) through 6(i).

          How images are combined and how they are displayed on the image planes are principally  
determined by predetermining the way of holding or  
15           the way of opening a book when sections are produced, the position of arrangement of images on pages, the number of pages of the sections and the order of input of the images on the pages. Preferably, the aforementioned  
predetermined data, such as the way of folding when  
20           the sections are produced, the way of opening a book (right-open or left-open), the position of arrangement of images on pages, the number of pages of the sections, the order of input of images on pages and the like are  
preset to the image display control device in  
25           accordance with the imaginary combination so as to perform operation in a simple manner. With this

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arrangement, ones to be checked can be designated from among the combinations of the preset data for immediate entry into checking operation. The designation of and change in the preset data and the like as described above are made so as to be accomplished by an image display operating device 50. For the image display operating device 50, a keyboard or the like can be used.

The printing image control device 48 is provided to process a display of a color image approximate to a printed matter on the color image display device 49 in response to signals received from the image display control device 47 as previously mentioned.

The printing effect greatly varies with the printing conditions, and it is therefore preferable that a plurality of printing conditions are preset to the printing image control device 48 so that suitable conditions may be selected by the printing image operating device 51 whereby the color image approximate to the printing result depending on the selected various printing conditions can be displayed on the color image display device 49.

Fig. 10 illustrates further details of the image display control device 47. An image to be color-displayed on the color image display operating device

49 is indicated by an indication signal  $S_1$  from an image display operating device 50. The indication signal  $S_1$  includes information, for example, such as what number the open page is. The indication  
5 signal  $S_1$  is put into a device 60 for selecting contents to be processed. On the other hand, stored in a reference pattern table 61 are the normal images or inverted images as viewed in the form of directions of images on pages to be color-displayed, as data  
10 predetermined in accordance with the number of pages of the sections, the way of folding and the like. The processed content selecting device 60 is provided to determine the processed contents such as whether or not the image on the page to be color-displayed in  
15 response to the indication signal  $S_1$  is displayed as the normal image without modification or displayed as the image with top and bottom inverted referring to the prestored reference pattern table 61 and to put the processed contents into data processors 62  
20 and 63 as processing signals  $S_2$  and  $S_3$ . On the other hand, put into the processors 62 and 63 are image signals  $S_4$  and  $S_5$  for two page portions of the opened-page to be display in color after said image signals have been selected from the memory 44.

25 In the data processor 62, in ease the processing signal  $S_2$  is the signal to be indicated

by inverting the top and bottom of the image, the image signal  $S_4$  is processed to be inverted and put into an image synthesizing device 64 as a synthesizing signal  $S_6$ . On the other hand, in case the processing signal  $S_2$  is the signal to be indicated as the normal image without inverting the direction of the top and bottom of the image, the image signal  $S_4$  is put into the image synthesizing device 64 as the synthesizing signal  $S_6$  without inverting the direction of the top and bottom. The data processor 63 likewise applies necessary processing to the image signal  $S_5$  in accordance with the processing signal  $S_3$  to input the synthesizing signal  $S_7$  to the image synthesizing device 64.

The data processors 62 and 63 once store the put-in image signals  $S_4$  and  $S_5$  to effect required processing in accordance with the processing signals  $S_2$  and  $S_3$ . Preferably, the obtained synthesizing signals  $S_6$  and  $S_7$  are once stored and subsequently put into the image synthesizing device 64. In the case of multi-color printing, such a processing is carried out in respect of Y, M, C and Bk.

The image synthesizing device 64 is provided to synthesize the synthesizing signals  $S_6$  and  $S_7$  so as they are synthesized to become same state as that of the opened-page, as shown in Fig. 4 or Fig. 6.

That is, the image synthesizing device 64 synthesizes the signals in such a way that the screen of the color image display device 49 is divided into two parts, left and right, in accordance with two synthesizing signals  $S_6$  and  $S_7$  to display thereon the image based on the synthesizing signal  $S_6$  and the image based on the synthesizing signal  $S_7$  together. The thus synthesized signal  $S_8$  is put into the printing image control device 48 where the former is appropriately processed so as to provide a monitor display approximate to the printing image, after which it is color-displayed on the color image display device 49.

As described above, the images on the pages are combined and successively displayed on the image display device as shown in Figs. 4(a) through 4(i) of Figs. 6(a) through 6(i) to easily check whether or not the images on the pages arranged on the flats are arranged in proper order. That is, if the images on the pages arranged on the flats are arranged in proper position under the proper condition, the images displayed on the image display device are successively displayed under the conditions illustrated in Fig. 4 or Fig. 6 in accordance with the predetermined conditions (namely, right-open or left-open). On the other hand, if the images on the pages arranged on the films with printing surface are erroneously

arranged, the order and the combination of the images displayed on the image display device become erroneous. It is therefore possible to very easily check whether or not the images on the pages are arranged in proper position by the images on the pages successively displayed on the image display device.

Fig. 11 illustrates the relation between the images arranged on the sheet-like material 20 and the image synthesized and displayed by the apparatus of the present invention. In Fig. 11(a), the images P4 and P5 on page 4 and on page 5 show an image of a head and an image of a tail, respectively, of a dog.

If the aforesaid arrangement is correct, the images on the opened-pages of pages 4 and 5 are properly synthesized and displayed on the screen of the color image display device.

However, if the image on P4 or P5 in Fig. 11(a) is arranged in erroneous position or the top and bottom thereof is arranged in the inverse direction, the image to be synthesized and displayed on the screen of the color image display device is not properly displayed as in Fig. 11(b), and it is therefore possible to judge momentarily that the arrangement is erroneous.

Furthermore, in case of color printing, for example, if the Y-separation positive flats and

M-separation positive flots are misplaced with respect to the image of P5 in Fig. 11(a), the color image to be synthesized and displayed in Fig. 11(b) becomes different in color of image in said misplaced portion.

5 It is therefore possible to momentarily judge that the image is misplaced.

Moreover, in case of color printing, for example, where the image of P4 and the image of P5 in Fig. 11(a) are the ones which are made by separate

10 plate-makers, checking whether or not the finished condition is the same, for example, checking whether or not there is a great difference in tone and density at a connected portion between P4 and P5 can be momentarily effected by synthesizing and displaying

15 the synthesized image on the color image display device as shown in Fig. 11(b).

While the present invention has been principally described of the section consisting of 16 pages, it will be noted that the present invention can be also

20 applied to a section consisting of 32 pages or other number of pages. As to a way of folding various ways of folding other than those as previously described can be considered. It is of course that the present invention may also be applied to the respective

25 ways of folding.

In accordance with the present invention, it is



possible to easily and assuredly check whether or not the images on the pages are properly arranged and attached in the stage of the flat, and therefore, loss in material and loss in time caused by misarrangement of pages can be prevented.

In addition, in accordance with the present invention, while the apparatus thereof can be also applied even in the stage wherein an image is formed on a printing plate as in the PS plate used in the offset printing system, it is more effective to apply it in the state of the flat.

Switchable addition of another function, for example, a function of not to display of the image by unit of two pages but to display of the image by unit of one page on the color image display device, to the apparatus of the present invention or the arrangement to make the magnification of the image displayed variable can be suitably achieved by those skilled in the art, if necessary.

In the apparatus of the present invention, even in the case of the flat for a plurality of page portions arranged on a film of large size, four color portions are not simultaneously photographed, and therefore, the apparatus of the invention can be made to be much smaller in size than the well known apparatus which photographs four color portions

simultaneously.

It will be noted that in case of the checking device for exclusive-use of monochrome which merely performs checking for monochromatic printing, the color  
5 image display device 49 of Fig. 9 can be replaced by a monochrome image display device, and in addition, the printing image control device 48 and the printing image operating device 51 can be omitted.

## WHAT IS CLAIMED IS:

1. A method of checking an arrangement of printing pages, which checks, where images for a plurality of page portions are printed simultaneously, whether or not the image on each page is arranged in a predetermined position, characterized in that images by unit of a section arranged on a sheet-like base material are photographed by a photographic device at every page in the predetermined order to store image signals thereof into a memory, the images of the thus stored image signals of each page are displayed on a display device in the predetermined order of page and by a predetermined combination, and said checking is carried out to see if the displayed images are in the proper position and in the proper order of page.

2. A method of checking an arrangement of printing pages, which checks, where images for a plurality of page portions are printed simultaneously, whether or not the image on each page is arranged in a predetermined position, characterized in that images by unit of a section arranged by unit of color on a sheet-like base material are photographed by a photographic device at every page in the predetermined order to store image signals thereof into a memory, the images of the thus

stored image signals of each page are displayed in color on a display device in the predetermined order of page and by a predetermined combination, and said checking is carried out to see if the displayed images are in the proper position and in the proper order of page.

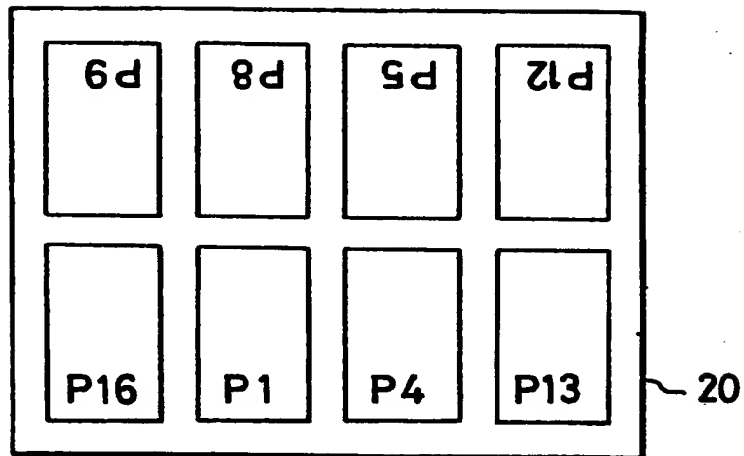
3. An apparatus of checking an arrangement of printing pages comprising a light source; a photographic device which can photograph at one time at least one page portion of images for a plurality of page portions arranged on a sheet-like base material; a photographic device driving mechanism for driving said photographic device in X and Y directions; a memory for storing the image signals photographed by said photographic device by unit of a section at every page; an image display device; and an image display control device which combines the image signals of each page stored in said memory by a predetermined combination, and in which an image necessary to invert the top and bottom of the image is inverted to successively input the image signals into said image display device, and said combined image is displayed on said image display device.

4. An apparatus of checking an arrangement of printing pages comprising a light source; a photographic device which can photograph at one time at least one page

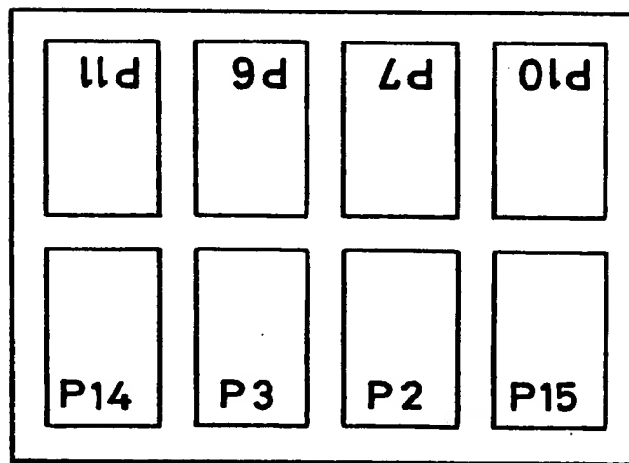
portion of images for a plurality of page portions  
arranged by unit of color on a sheet-like base material;  
a photographic device driving mechanism for driving  
said photographic device in X and Y directions; a  
5 memory for storing image signals photographed by said  
photographic device by color and by unit of a section  
at every page; a color image display device; and an  
image display control device which combines the image  
signals of each page stored by color in said memory  
10 by a predetermined combination and in which an image  
necessary to invert the top and bottom of the image  
is inverted and further the image signals by color  
of the corresponding pages are synthesized and  
thereafter said combined image is displayed in  
15 color on said color image display device by successively  
inputting the image signals into said color image  
display device.

FIG. 1

(a)



(b)



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FIG. 2

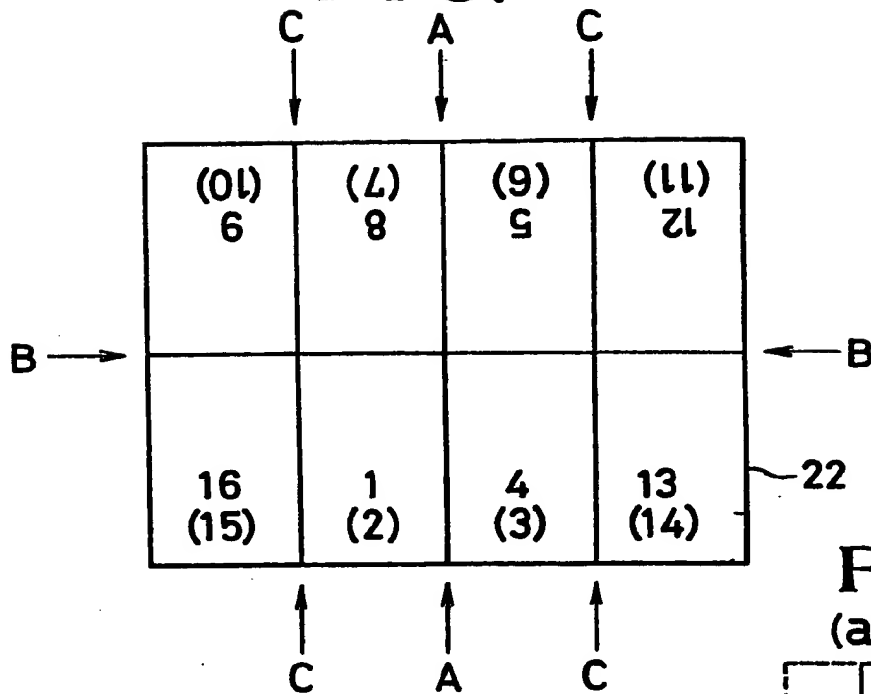


FIG. 3

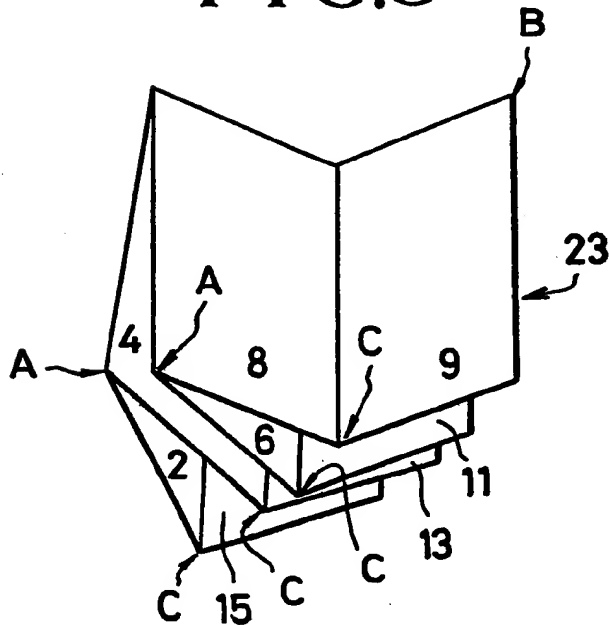
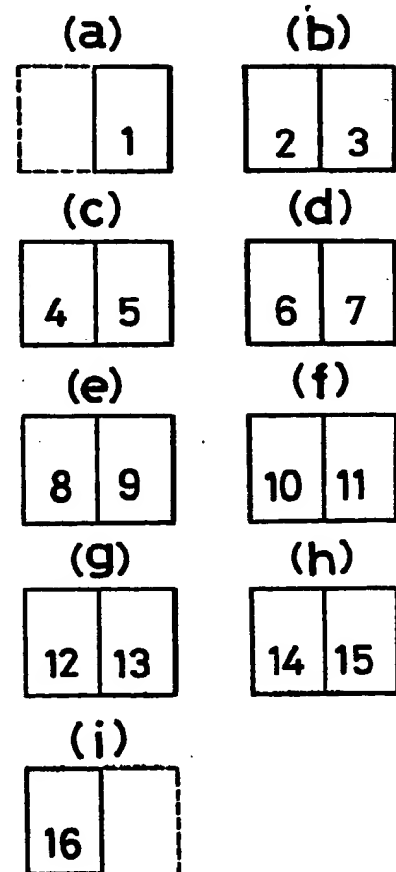
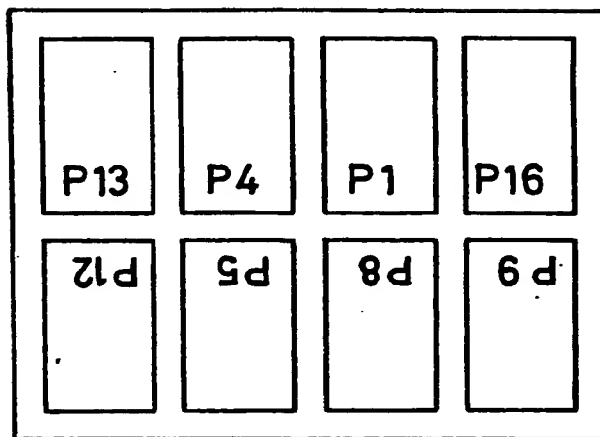


FIG. 4

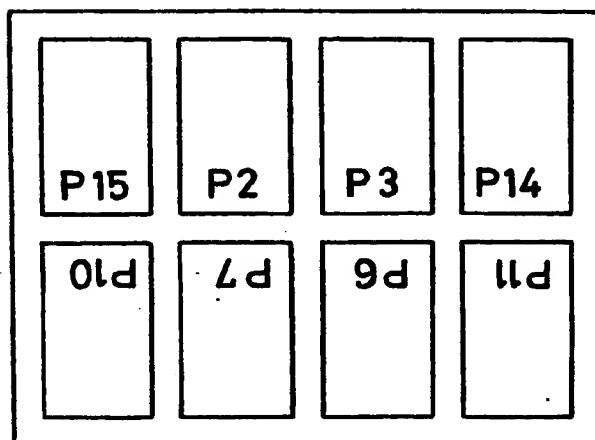


# FIG.5

(a)

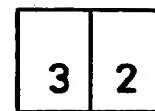


(b)

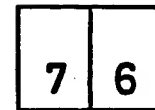


# FIG.6

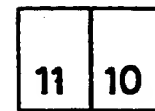
(b)



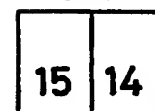
(d)



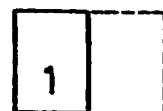
(f)



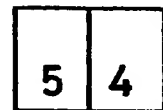
(h)



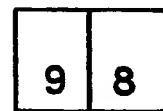
(a)



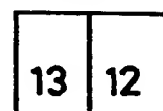
(c)



(e)



(g)



(i)

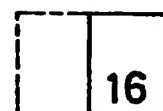




FIG. 7

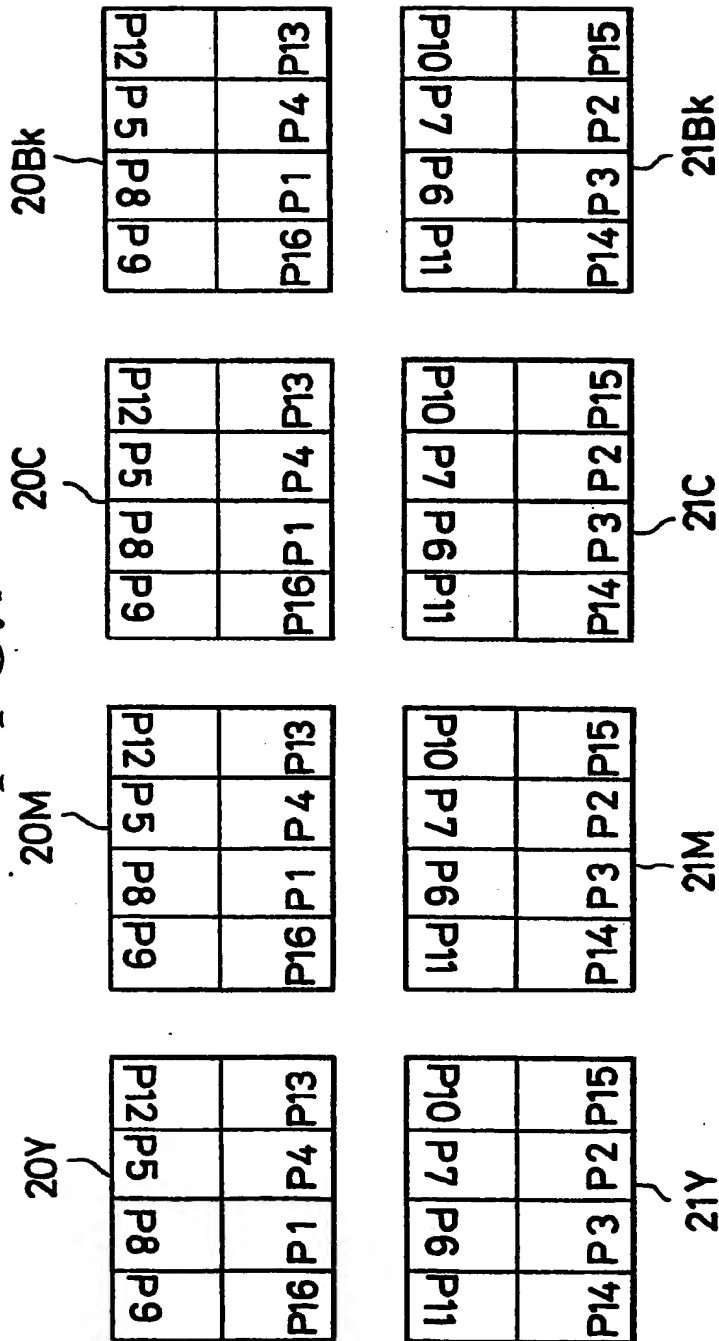


FIG. 8

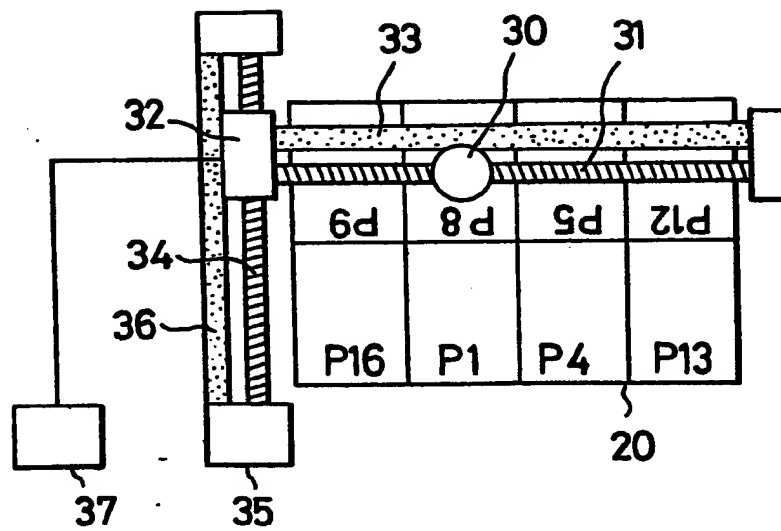


FIG. 10

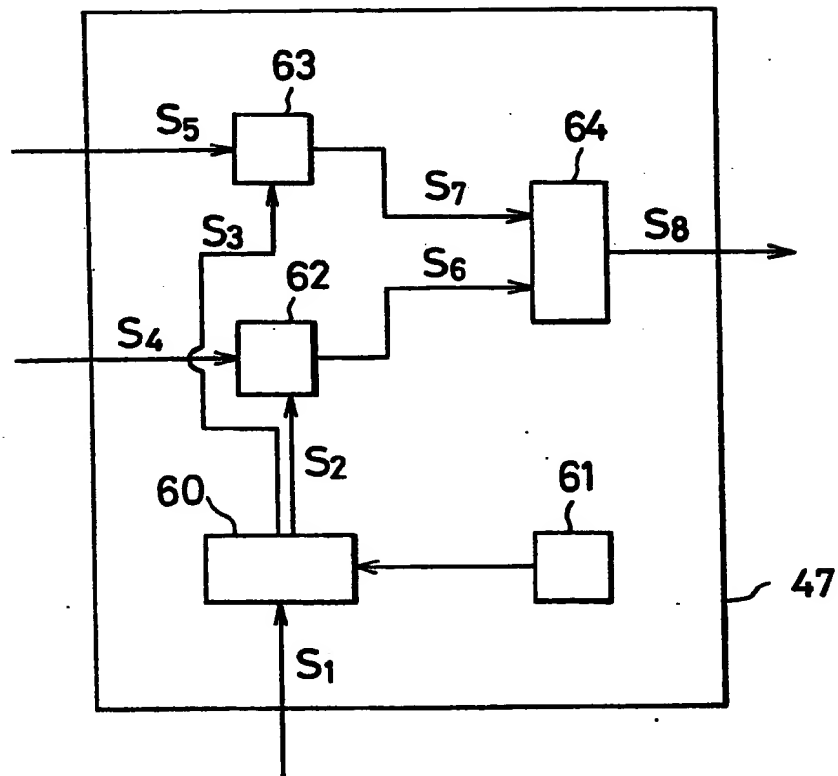


FIG. 9

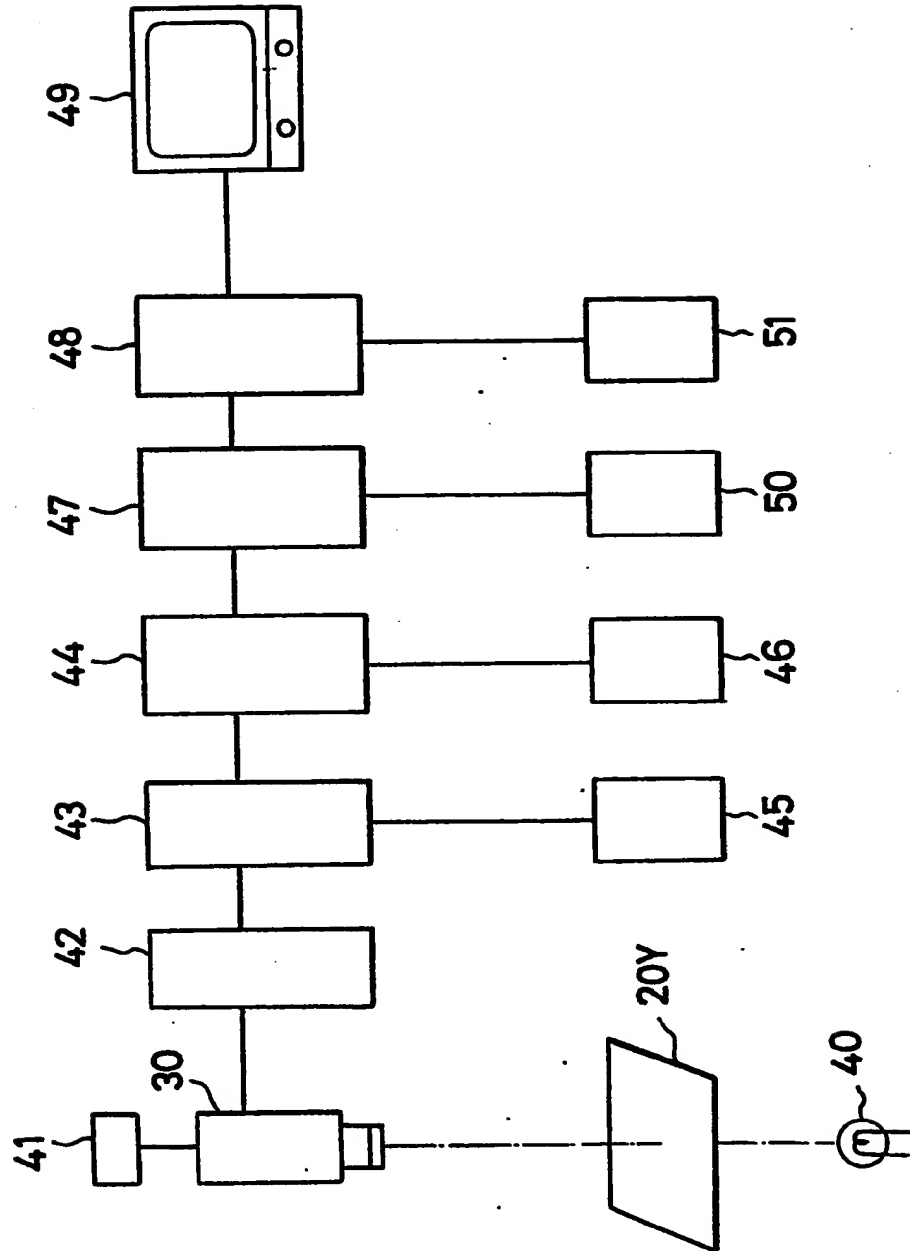
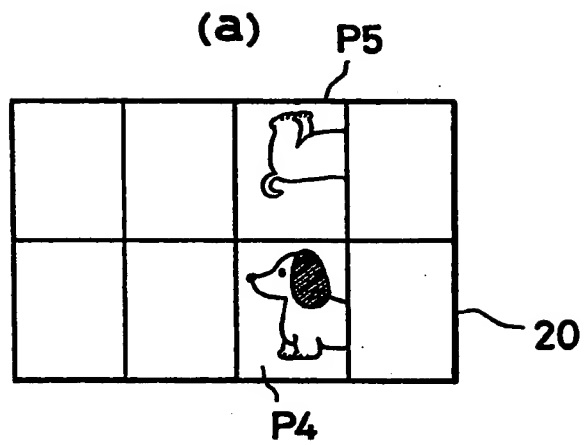


FIG. 11



(b)

